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Exploring the intersection of digital transformation and workforce productivity: A comprehensive bibliometric review

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Abstract This bibliometric analysis explores the scholarly landscape surrounding the topic of digital transformation (DT) and its impact on employee performance. Drawing upon a comprehensive review of relevant literature, the study examines trends, patterns, and emerging themes in research published over the past two decades. The analysis encompasses a wide range of interdisciplinary fields, including management, information systems, human resources, and organizational behavior, reflecting the multifaceted nature of digital transformation research. Key findings reveal a significant increase in publications on digital transformation and employee performance, with notable thematic clusters emerging around the role of digital technologies, organizational culture, and strategic capabilities in driving performance outcomes. Additionally, the analysis identifies prominent journals, authors, and institutions contributing to this research area, providing valuable insights for scholars and practitioners alike. Overall, this bibliometric analysis offers a comprehensive overview of the scholarly discourse on digital transformation and employee performance, highlighting avenues for future research and practical implications for organizational management and policy development.

Keywords: digital technologies, employee performance, VOS viewer, bibliometric analysis

1. Introduction

In the contemporary landscape of organizational management, digital transformation has emerged as a pivotal force reshaping the dynamics of businesses worldwide (Alvarenga et al., 2020; Peter et al., 2020; Vial, 2019). As enterprises strive to stay competitive and relevant in the digital age, integrating technology has become imperative for optimizing operational efficiency and enhancing the performance of their most valuable asset—their employees (Salih et al., 2024; Afaishat et al., 2024). This article delves into digital transformation and its profound impact on augmenting employee performance through a comprehensive bibliometric analysis.

The advent of digital technologies, encompassing artificial intelligence, big data analytics, cloud computing, and automation, has revolutionized traditional business models and practices (Gong & Ribiere, 2021). Organizations leverage these technologies to streamline processes, facilitate communication, and foster innovation (Thapa et al., 2022). Amidst this transformative wave, the role of employees has evolved from mere executors of tasks to strategic partners driving organizational growth and innovation (Ulatowska et al., 2023). Consequently, understanding the intricate relationship between digital transformation initiatives and employee performance has become paramount for scholars and practitioners (Çini et al., 2023; Ye & Chen, 2024)

Bibliometric analysis offers a systematic approach to exploring the existing literature on digital transformation and employee performance. This study aims to identify the key themes, trends, and research gaps within this domain by employing bibliometric techniques. Through a rigorous examination of scholarly publications, including journal articles, conference papers, and books, this analysis seeks to provide valuable insights into the evolution of research on digital transformation and its implications for employee performance enhancement.

The significance of this research lies in its potential to inform managerial practices and strategic decision-making in organizations undergoing digital transformation initiatives (Roth, 2019). By synthesizing the existing knowledge base, this study seeks to explain how digital technologies influence various dimensions of employee performance, such as productivity, job satisfaction, and organizational commitment. Furthermore, this analysis aims to guide future research endeavours in this rapidly increasing field by uncovering emerging research trends and areas requiring further exploration.

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This article contributes to the scholarly discourse on digital transformation and employee performance by offering a comprehensive bibliometric analysis of the literature. By synthesizing and analyzing a vast array of scholarly publications, this study aims to elucidate the multifaceted relationship between digital transformation initiatives and the performance outcomes of employees. Through a systematic examination of the existing knowledge base, this research endeavours to provide valuable insights that can inform managerial practices and shape the future research trajectory in this domain.

2. Materials and Methods

Bibliometric analysis offers a methodical and quantitative way to assess and visualize the current literature within a particular study field. Bibliographic variables, including publication year, authors, citations, keywords, and collaboration practices, are analyzed to identify trends, influential works, and research hotspots. Researchers can use bibliometric tools to explore a field's intellectual structure and dynamics, discover emerging issues, and identify potential gaps or opportunities for future research.

In the bibliometric paper on digital transformation, the following research questions have been formulated to guide the analysis:

RQ1. What are the trends? What are the research trends in digital transformation according to the year of publication?
RQ2: Who writes the most-cited articles? In addition, where do they work?
RQ3: What are the types of documents by subject of research?
RQ4: Who are the top 10 authors based on research citations?
RQ 5 What are the popular keywords related to the study?
RQ6: What are co-authorship countries' collaborations?
RQ7: What network mapping method is based on citations by country?

The research questions seek to understand the digital transformation literature thoroughly by examining publication trends, influential authors and their affiliations, document types and research areas, highly cited works, prominent keywords, international collaborations, and citation networks across countries. A bibliometric analysis of these topics can reveal significant insights, enhancing the current knowledge in this area.

3. Methodology

Bibliometrics involves collecting, organizing, and analyzing bibliographic data from scientific publications (Özdemir et al., 2023; Shi et al., 2022; Sreenivasan & Suresh, 2023). The data includes basic descriptive statistics such as publishing journals, publication year, major author categorization, and advanced approaches such as document co-citation analysis. An effective literature review requires a systematic approach that includes identifying relevant keywords, searching for literature, and analyzing thoroughly to create a comprehensive bibliography and produce reliable results (Shi et al., 2022). The study aimed to concentrate on top-tier papers to provide useful insights into the theoretical views influencing the development of the research field. The study ensured data trustworthiness by utilizing the SCOPUS database for data collection (Faisal, 2023; Sreenivasan & Suresh, 2023; Zhang et al., 2017). Only articles from thoroughly peer-reviewed academic journals were included to guarantee high-quality publication. Books and lecture notes were intentionally excluded. Elsevier's Scopus, renowned for its comprehensive coverage, gathered publications from 1962 to February 2024 for study. Table 1 provides the search string used for the current study.

Table 1 Search string

Scopus	TITLE-ABS-KEY (("digital transformation" OR digitiz*ation OR "digital technology") AND ("employee performance" OR "employee productivity" OR "employee*")) AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English"))

3.1. Data search strategy

The study employed a screening sequence to determine the search terms for article retrieval. The study was initiated by querying the Scopus database online and assembling 2663 articles. Afterwards, the query string was revised. The refinement included 1066 articles, which were used for bibliometric analysis. As of March 2024, all the articles from the Scopus database related to digital transformation and employee performance were included in the study. Table 2 provides the search selection criteria.

3.2. Data analysis

The VOS viewer is a bibliometric software created by Nees Jan van Eck and Ludo Waltman at Leiden University in the Netherlands (Eck & Waltman, 2006; Eck & Waltman, 2017). The program is commonly used for visualizing and analyzing scientific literature. It specializes in building intuitive network visualizations, clustering similar items, and generating density

maps. The tool's adaptability enables researchers to analyze co-authorship, co-citation, and keyword co-occurrence networks, offering thorough insight into research landscapes. The interactive interface and regular updates guarantee effective and dynamic analysis of extensive datasets. VOSviewer is a significant tool for scholars looking to gain insights into intricate research areas because of its ability to calculate metrics, personalize visualizations, and interoperability with different bibliometric data sources.

Table 2 Search selection criteria.

Criterion	Inclusion	Exclusion
Timeline	2000-2024	<2000
Language	English	Non-English
Document Type	Article	Non-Article
Source type	Journal (Article) and proceeding	Book, Review

VOSviewer stands out for its ability to convert complex bibliometric statistics into visually understandable maps and charts. The program specializes in network visualization, excelling in clustering related items, analyzing keyword co-occurrence patterns, and generating density maps. The user-friendly interface of the tool benefits researchers by allowing both novices and experts to explore study areas easily. VOSviewer's ongoing advancement guarantees that it remains at the forefront of bibliometric analysis by providing significant insights through metric calculation and customizable visualizations. VOSviewer's capacity to address various bibliometric data, such as co-authorship and citation networks, makes it a versatile and essential tool for scholars seeking deeper insights and comprehension in their research areas.

Datasets containing publication year, title, author name, journal, citation, and keywords in Plaintext format were obtained from the Scopus database, covering 2020- December 2023. The datasets were analyzed via VOSviewer software version 1.6.19. This software enables the analysis and creation of maps via VOS clustering and mapping algorithms. VOSviewer provides an alternative to multidimensional scaling (MDS) by placing objects in low-dimensional spaces to represent their relatedness and similarity accurately. VOSviewer is similar to the MDS method (Appio et al., 2014).

3.3. Results and findings

RQ1: What are the research trends in digital transformation concerning employee performance according to the year of publication?

The bibliometric analysis reveals a notable trend in the publication of research articles focused on digital transformation for increasing employee performance over the past years. The data indicate a consistent upward trajectory in the number of publications from 2020 to 2023, with a peak of 296 publications in 2023 (see Figure 1). This significant increase suggests a growing interest in and emphasis on understanding the role of digital transformation in optimizing employee performance across various industries and organizational settings (Pereira et al., 2022).

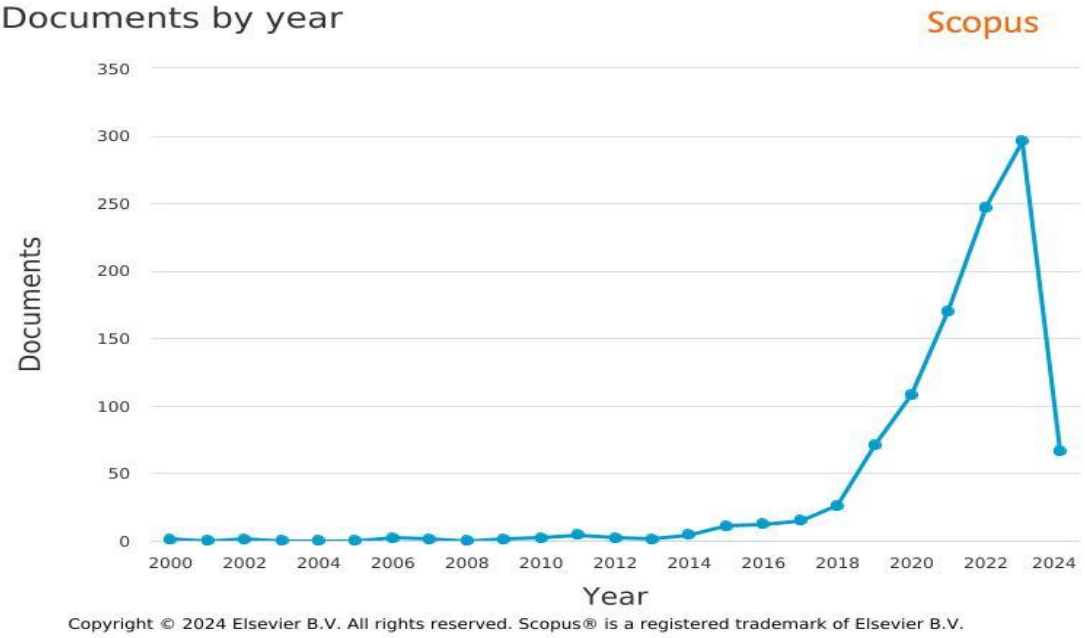

Figure 1 Number of publications by year. *source:* Scopus database.

However, there appears to be a slight decrease in the number of publications in 2024 compared with the previous year, with 63 publications recorded thus far (see Table 3). The apparent decrease in publications in 2024 should be interpreted cautiously, as this analysis encompasses only the year's first three months. With nine months remaining in 2024, the current publication count of 63 represents a preliminary snapshot rather than a comprehensive annual assessment. This methodological consideration is crucial, as premature conclusions about research trends could be misleading. Bharadwaj et al. (2013) remind us that research domains experience cyclical patterns of exploration and consolidation, and a partial-year dataset may not fully reflect the complete research landscape. Therefore, the seemingly reduced publication count likely reflects the temporal limitations of the data collection period rather than a substantive decline in scholarly interest in digital transformation and employee performance. Overall, the data underscores the increasing scholarly attention and research output dedicated to exploring the intersection of digital transformation and employee performance.

Table 3 Number of publications.

Year	Number of publications	Percentage
2024	87	8.12
2023	303	28.29
2022	249	23.25
2021	170	15.87
2020	108	10.08
2019	71	6.63
2018	26	2.43
2017	15	1.40
2016	12	1.12
2015	11	1.03
2014	4	0.37
2013	1	0.09
2012	2	0.19
2011	4	0.37
2010	2	0.19
2009	1	0.09
2007	1	0.09
2006	2	0.19
2002	1	0.09
2000	1	0.09

Furthermore, the distribution of publications across the years highlights the evolving nature of research interests and priorities within digital transformation and employee performance. The surge in publications observed in 2023 may reflect a heightened focus on addressing pressing challenges and opportunities arising from the rapid digitalization of work environments, particularly in response to the COVID-19 pandemic. During this period, they have witnessed a surge in studies investigating the effects of digital technologies, remote work arrangements, and digital leadership practices on employee performance outcomes. As the field continues to mature, researchers may shift their focus toward more nuanced inquiries, such as the long-term sustainability of digital transformation initiatives, the role of organizational culture in fostering digital adoption, and the ethical implications of digital technologies in the workplace. Consequently, while the number of publications in 2024 may indicate a slight stabilization or consolidation phase, it also signifies a crucial juncture for researchers to delve deeper into understanding the multifaceted dynamics of digital transformation for enhancing employee performance.

RQ2: Who writes the most articles?

The bibliometric analysis of top researchers in digital transformation for increasing employee performance reveals that a notable group of scholars have made significant contributions to the field. Chatterjee, Chaudhuri, and Vrontis emerged as leading authors, with five publications representing a substantial presence in this research area as shown in Figure 2. Their collective work likely covers various aspects of digital transformation initiatives to enhance employee performance across different organizational contexts. Their publications may explore topics such as the implementation of digital tools and technologies, organizational change management strategies, and the impact of digitalization on employee productivity and motivation. Arias-Pérez, Chin, and Sarfraz also stand out with four publications each, indicating their active engagement and expertise in exploring the relationship between digital transformation efforts and employee performance. Their research will

likely delve into the effectiveness of digital interventions in driving organizational success, such as digital training programs, performance management systems, and remote work arrangements.

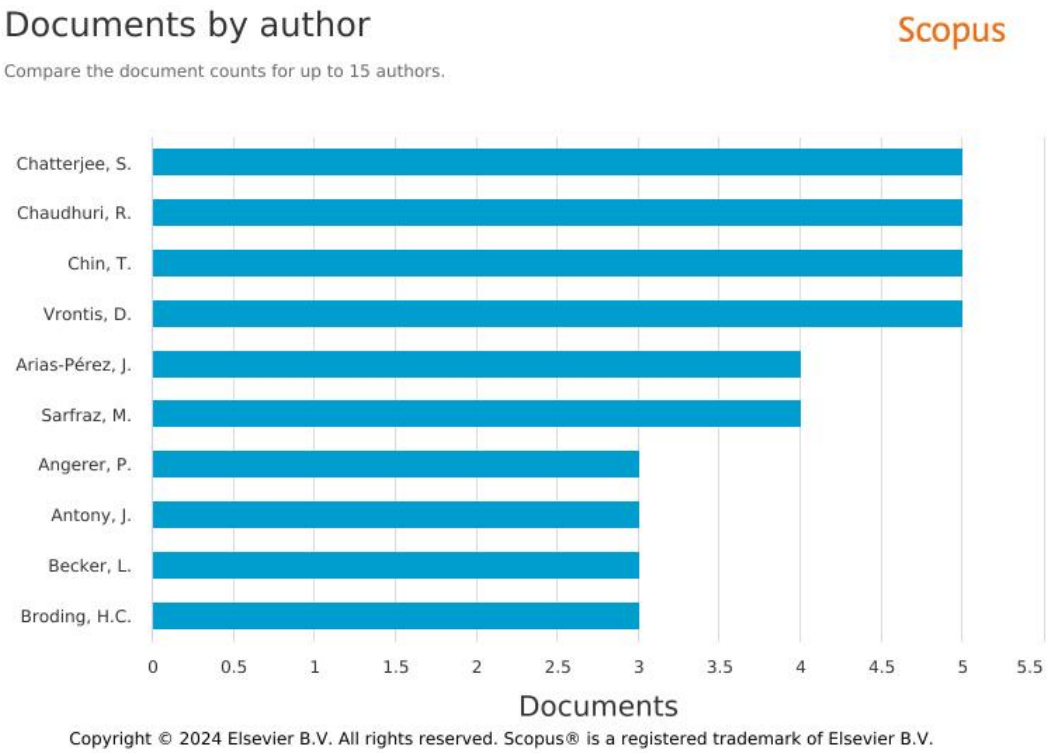

Figure 2 Top ten Authors. *Source:* Scopus database.

Moreover, three publications, Antony, Becker, Broding, and Claassen, underscore the diversity of perspectives and research interests within this field. These scholars are likely investigating various dimensions of digital transformation initiatives, such as the role of leadership in driving digital change, the adoption of digital technologies for talent management, and the implications of digitalization for employee well-being and work-life balance. These researchers play pivotal roles in advancing knowledge and understanding how digital transformation can be leveraged to optimize employee performance in today's rapidly evolving digital landscape. Their contributions provide valuable insights for organizations seeking to navigate the complexities of digitalization and harness its potential to drive organizational effectiveness and competitiveness through enhanced employee performance.

RQ3. What are the types of documents by subject of research?

The analysis of publications on "digital transformation for increasing employee performance" reveals a diverse range of subject areas contributing to this interdisciplinary field. Business, management, and accounting emerged as the dominant subject areas, with 369 publications constituting 41.74%, which suggests a strong focus on the organizational aspects of digital transformation and its impact on employee performance. Social sciences closely followed, with 335 publications (37.90%) indicating significant interest in digital transformation initiatives and socioeconomic and behavioural implications within organizations. Moreover, Computer Science, Engineering, and Environmental Science contribute substantially, reflecting the technological and environmental dimensions inherent in digital transformation efforts. This trend is shown in Figure 3.

Interestingly, while subjects such as medicine, psychology, economics, econometrics, and finance make notable contributions, they represent a smaller percentage of publications than fields directly related to business and technology do (see Table 4). This suggests a growing recognition of the interdisciplinary nature of digital transformation, encompassing not only technical aspects but also organizational, social, and environmental considerations. The distribution of publications across diverse subject areas underscores the multifaceted impact of digital transformation on various aspects of society. This highlights the need for collaborative research efforts across disciplines to comprehensively understand and address the challenges and opportunities posed by this phenomenon.

RQ4. Who are the top 10 authors based on citations by research?

The analysis of the most cited articles on "Digital Transformation for Increasing Employee Performance" reveals several key themes and areas of interest within the field. One notable study by Ashfaq et al. (2020) explored the user satisfaction and continuance intention of AI-powered service agents, shedding light on the determinants influencing users' perceptions and

behaviours toward chatbot services. Another significant contribution of Rachinger et al. (2019) is the investigation of the impact of digitalization on BMI, highlighting the transformative effects of digital technologies on organizational strategies and structures. Additionally, research by Bartsch et al. (2021) focuses on the role of leadership in crisis-induced digital transformation, particularly during the COVID-19 pandemic, emphasizing the importance of effective leadership in guiding service employees through challenging times. Table 5 provides the details of the top 10 authors with their total number of publications.

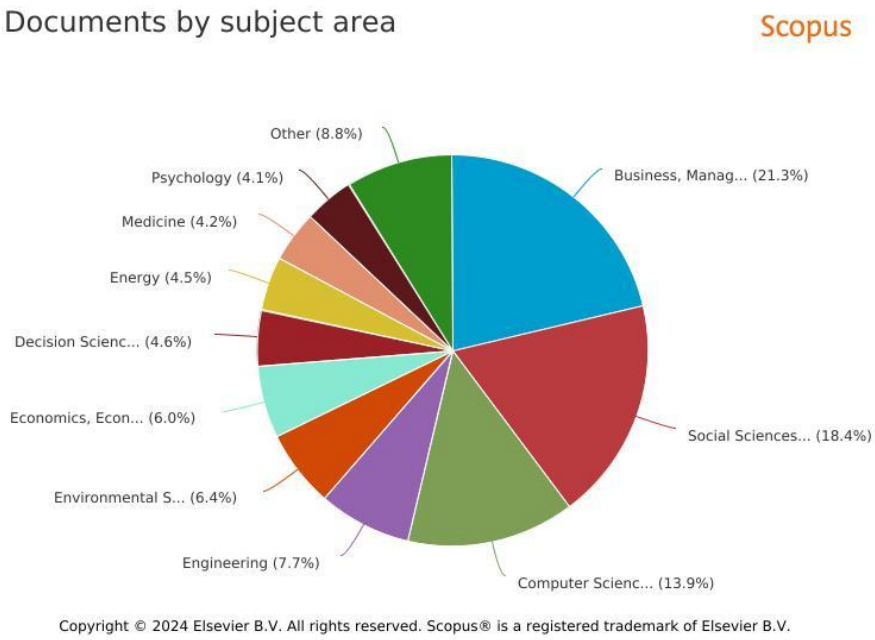

Figure 3 Pie chart for documents by subject area. *Source:* Scopus database.

Table 4 Documents by subject area.

Subject Area	Number of Publication	Percentages %
Business, Management and Accounting	469	21.593
Social Sciences	404	18.60037
Computer Science	306	14.0884
Engineering	164	7.550645
Environmental Science	136	6.26151
Economics, Econometrics and Finance	129	5.939227
Energy	98	4.511971
Decision Sciences	96	4.41989
Psychology	92	4.235727
Medicine	89	4.097606
Arts and Humanities	39	1.79558
Mathematics	30	1.381215
Materials Science	20	0.92081
Multidisciplinary	18	0.828729
Agricultural and Biological Sciences	18	0.828729
Biochemistry, Genetics and Molecular Biology	12	0.552486
Health Professions	11	0.506446
Neuroscience	9	0.414365
Chemical Engineering	8	0.368324
Physics and Astronomy	8	0.368324
Earth and Planetary Sciences	6	0.276243
Chemistry	4	0.184162
Nursing	4	0.184162
Immunology and Microbiology	1	0.046041
Pharmacology, Toxicology and Pharmaceutics	1	0.046041

Table 5 List of the top ten authors with their number of publications.

Author Name	Number of publication	Percentages
Chatterjee, S.	5	0.47
Chaudhuri, R.	5	0.47
Chin, T.	5	0.47
Vrontis, D.	5	0.47
Arias-Pérez, J.	4	0.38
Sarfraz, M.	4	0.38
Angerer, P.	3	0.28
Antony, J.	3	0.28
Becker, L.	3	0.28
Broding, H.C.	3	0.28

Furthermore, studies such as those by Bentley et al. (2016) and Singh et al. (2019) delve into the socio-technical aspects of digital transformation, examining the role of organizational support in teleworker well-being and the evolving nature of sales professions in the age of digitization and artificial intelligence technologies, respectively. These articles underscore the multidimensional nature of digital transformation, encompassing technological advancements, organizational dynamics, human factors, and societal implications. Overall, the most cited articles offer valuable insights into the complexities and opportunities associated with digital transformation initiatives to enhance employee performance and organizational outcomes (see Table 6).

Table 4 Top authors by citations.

Authors	Title	Year	Source Title	Cited by
Ashfaq et al.	I, Chatbot: Modeling the determinants of users' satisfaction and continuance intention of AI-powered service agents	2020	Telematics and Informatics	299
Bauer et al.	Transforming to a Hyperconnected Society and Economy – Toward an "Industry 4.0"	2015	Procedia Manufacturing	165
Yeh et al.	Knowledge management enablers: A case study	2006	Industrial Management and Data Systems	235
Veile et al.	Lessons learned from Industry 4.0 implementation in the German manufacturing industry	2020	Journal of Manufacturing Technology Management	182
Rachinger et al.	Digitalization and its influence on business model innovation	2019	Journal of Manufacturing Technology Management	469
Bartsch et al.	Leadership matters in crisis-induced digital transformation: how to lead service employees effectively during the COVID-19 pandemic	2021	Journal of Service Management	168
Balsmeier & Woerter	Is this time different? How digitalization influences job creation and destruction	2019	Research Policy	164
Bentley et al.	The role of organizational support in teleworker well-being: A socio-technical systems approach	2016	Applied Ergonomics	291
Birkel et al.	Development of a risk framework for Industry 4.0 in the context of sustainability for established manufacturers	2019	Sustainability (Switzerland)	259
Singh et al.	Sales profession and professionals in the age of digitization and artificial intelligence technologies: concepts, priorities, and questions	2019	Journal of Personal Selling and Sales Management	173

RQ5. What are the popular keywords related to the study?

The analysis conducted via VOS Viewer software provides valuable insights into keyword occurrence and total strength within research articles related to digital transformation for increasing employee performance. Among the prominent keywords, "digital transformation" is the most frequently occurring term, with a total link strength of 310, indicating its central importance in the literature. This reflects the widespread recognition of digital transformation as a pivotal factor influencing organizational strategies and initiatives to enhance employee performance. Moreover, keywords such as "digitalization" and "Industry 4.0" exhibit substantial occurrence and total link strength, underscoring the emphasis on leveraging digital technologies and automation to optimize organizational processes and workflows. These findings suggest a strong focus on harnessing technological advancements to drive digital transformation initiatives that ultimately improve employee performance across diverse organizational contexts.

Furthermore, the keyword analysis highlights other critical themes and concepts within the research domain. For example, terms such as "COVID-19" and "remote work" demonstrate significant occurrences and total link strength, reflecting the growing relevance of remote work arrangements and the impact of the COVID-19 pandemic on workplace dynamics and employee performance. Additionally, keywords related to "digital leadership", "digital skills," and "employee engagement" indicate a keen interest in exploring the role of leadership practices, skill development initiatives, and employee involvement strategies in driving successful digital transformation efforts. Moreover, the presence of keywords such as "sustainability," "innovation," and "sustainable development" underscores the broader organizational objectives of fostering sustainability and innovation through digital transformation initiatives. Overall, keyword analysis provides a comprehensive overview of the key themes and trends shaping the discourse on digital transformation and its implications for enhancing employee performance within contemporary organizational contexts (see Figure 4).

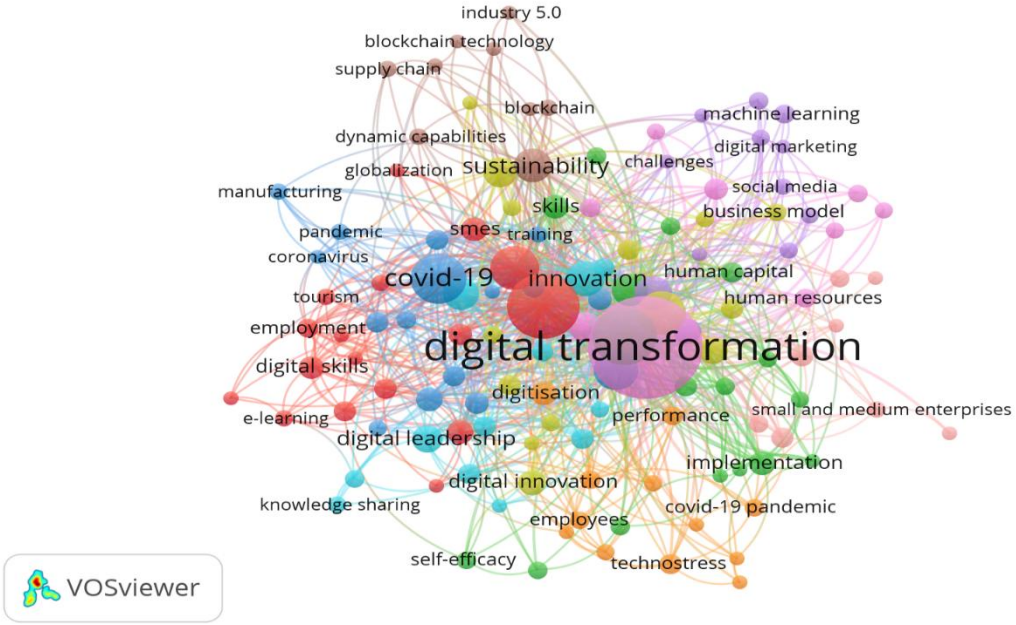

Figure 4 Network visualization map of keyword co-occurrence.

RQ6. What are co-authorship countries' collaborations?

The collaboration network analysis of co-authorship countries reveals significant international collaboration patterns concerning digital transformation research for increasing employee performance. The United States and the United Kingdom emerged as the leading contributors to this research domain, with substantial document counts, citations, and total link strength. This indicates a high research output and influence level, suggesting strong collaboration networks within these countries and their respective research institutions. Countries such as Germany, China, and Australia have also made notable contributions, underscoring the global nature of research endeavours. These findings highlight the importance of international collaboration in advancing knowledge and understanding regarding the impact of digital transformation on employee performance as researchers from diverse geographical regions come together to address common research questions and challenges. The country-wise collaboration is shown in Figure 5.

Moreover, the analysis reveals interesting trends in collaboration among countries with smaller research outputs. For example, countries like Finland, the Netherlands, and Sweden demonstrate relatively high total link strength despite moderate document counts, indicating strong collaboration ties within smaller research communities. This suggests that these countries prioritize collaboration and knowledge sharing to enhance research outcomes and contribute to the broader discourse on digital transformation and employee performance. Furthermore, emerging research hubs such as India and Malaysia also show significant involvement in international collaboration efforts, reflecting the increasing global interest and participation in addressing issues related to digital transformation and its implications for employee performance. Overall, the collaboration network analysis provides valuable insights into the dynamics of international research collaboration in the context of digital transformation, highlighting the interconnectedness of researchers and institutions worldwide in advancing knowledge and innovation in this field.

RQ7. What network mapping is based on citations by country?

The citation analysis by country sheds light on the impact and recognition of research conducted on digital transformation for increasing employee performance across different regions. The United States and the United Kingdom

emerged as leading citation contributors, with significantly higher citation counts than others. This suggests that research from these countries has garnered substantial attention and recognition within the academic community, indicating the quality and influence of their research output. Furthermore, countries such as Germany, China, and Australia also demonstrate notable citation counts, highlighting their significant contributions to the scholarly discourse on digital transformation and its implications for employee performance. These findings underscore the global relevance and impact of research conducted in these countries, reflecting the widespread interest and recognition of their scholarly endeavours in this field (see Figure 6).

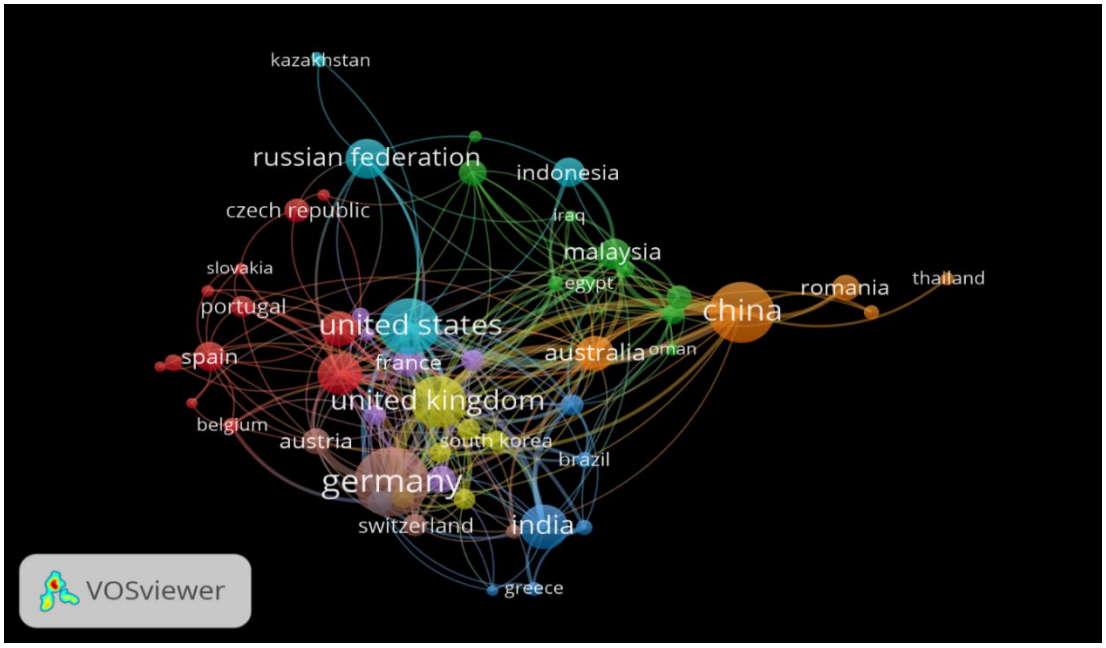

Figure 5 Country-wise collaboration.

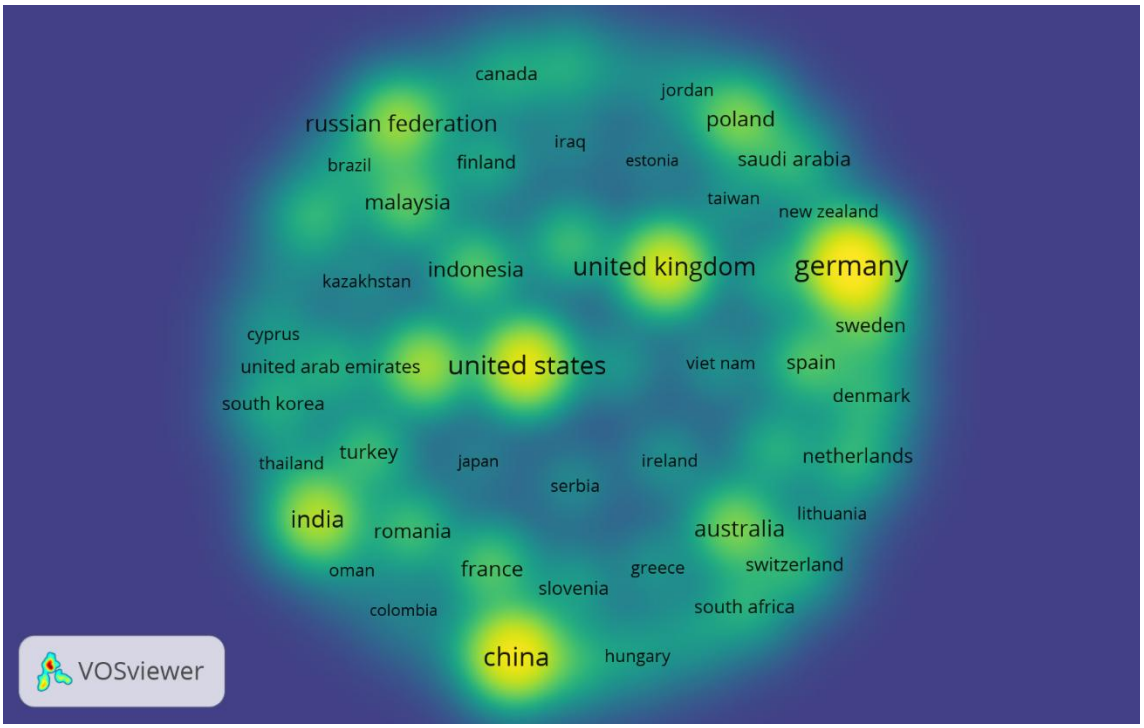

Figure 6 Network mapping.

Additionally, the citation analysis reveals interesting patterns in the citation impact of research from countries with smaller research outputs. Countries such as Finland, the Netherlands, and Sweden present relatively high citation counts compared with their document counts, indicating the high impact and visibility of research originating from these regions. This suggests that despite their smaller research outputs, these countries produce high-quality and significant research that receives worldwide recognition and citations from scholars. Moreover, emerging research hubs such as India and Malaysia demonstrate

substantial citation impact, reflecting the growing recognition and influence of their research contributions in digital transformation and employee performance. Overall, the citation analysis underscores the importance of quality research output in driving scholarly impact and recognition, regardless of the size or geographical location of the contributing country.

Furthermore, the citation analysis underscores the collaborative nature of research on digital transformation and employee performance, as evidenced by the citation counts from diverse geographical regions. The high citation counts observed across various countries highlight the interconnectedness and global collaboration among researchers and institutions in advancing knowledge and understanding in this field. This finding indicates that research on digital transformation and its impact on employee performance is a global endeavour, with scholars from different regions actively contributing to and building upon each other's work. These findings emphasize the importance of international collaboration in driving innovation and progress in research on digital transformation, ultimately contributing to the improvement of employee performance in organizations worldwide.

RQ8. Citation by co-citation through co-authorship

In conducting a bibliometric analysis titled "Digital Transformation for Increasing Employee Performance: A Bibliometric Analysis," co-citation analysis through co-authorship is a valuable method for exploring collaborative networks among authors in the field. This table presents data on the citations and total link strength for various authors, indicating their prominence and influence within the scholarly community studying digital transformation and employee performance. Authors such as Bakker A.B. Dhir A. and Tarafdar M. stand out for their substantial citation counts and high total link strengths, suggesting significant contributions to the literature in this domain. Their collaborative efforts with other authors likely reflect important research partnerships that have shaped the discourse on digital transformation and employee performance (see Figure 7).

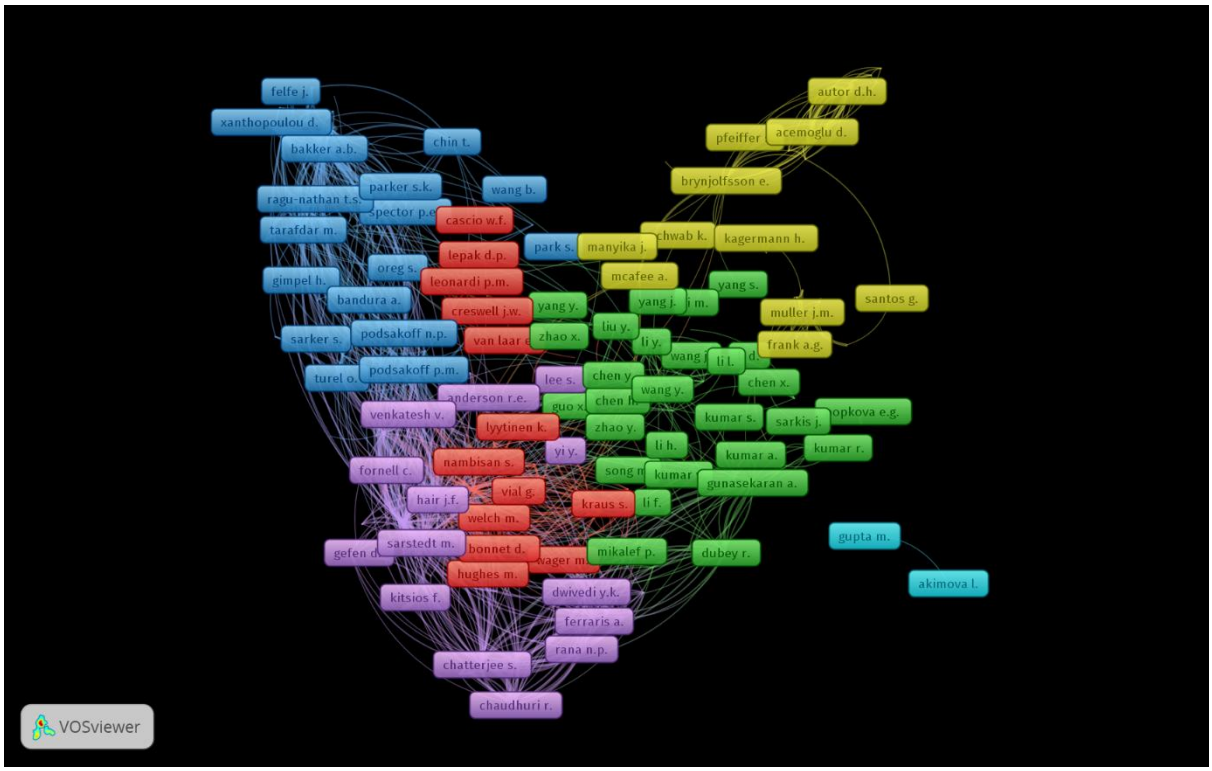

Figure 7 Co-citation through co-authorship.

Moreover, the data reveal patterns of collaboration and influence among authors in this field. For example, certain authors, such as Venkatesh V. and Srivastava S.C. have amassed many citations and strongly linked them with other authors, indicating their central role in the scholarly network. As reflected in co-authorship relationships, collaborative ties between authors are essential for advancing knowledge and fostering interdisciplinary research in areas such as digital transformation and employee performance. By analyzing co-citation through co-authorship, researchers can identify key scholars and research groups that drive innovation and shape digital transformation's theoretical and practical landscape in organizational settings. This analysis can inform future research directions and facilitate collaborations that contribute to further understanding and addressing challenges in this dynamic field.

4. Discussion and Conclusion

The analysis of research trends in digital transformation and its relationship to employee performance, as per the year of publication, reveals a significant surge in scholarly interest over the past five years. Notably, there was a consistent increase in publications from 2020 to 2023, peaking at 296 publications in 2023. This upward trajectory underscores the growing emphasis on understanding the role of digital transformation in optimizing employee performance across diverse industries and organizational settings. However, a slight decrease in publications in 2024, with 63 recorded thus far, suggests a potential slowdown in research activity. While this decline might indicate a stabilization phase, factors such as publication cycles and ongoing research projects should be considered. Overall, the data underscores the increasing scholarly attention and research output dedicated to exploring the intersection of digital transformation and employee performance.

Furthermore, the distribution of publications across the years highlights the evolving nature of research interests within the field. The surge in publications in 2023 likely reflects a heightened focus on addressing challenges and opportunities arising from the rapid digitalization of work environments, particularly during the COVID-19 pandemic. As the field matures, researchers may focus on more nuanced inquiries, such as the sustainability of digital transformation initiatives and the ethical implications of digital technologies in the workplace. The current publication count of 63 for 2024 reflects an inherent limitation of our data collection methodology. With data available only for the first three months, this represents approximately 25% of the potential annual research output. Scholarly publication patterns demonstrate considerable variability, and a comprehensive assessment would require full-year data to draw definitive conclusions about research trends in digital transformation and employee performance (Bharadwaj et al., 2013; Cosa & Torelli, 2024; Margolang et al., 2024; Suwaji et al., 2024).

In terms of the most prolific authors in this domain, Chatterjee, Chaudhuri, and Vrontis emerged as leading contributors, each with five publications reflecting their substantial presence and expertise (Chatterjee et al., 2023). Their collective work likely covers various aspects of digital transformation initiatives to enhance employee performance. Other scholars, such as Arias-Pérez, Chin, and Sarfraz, have also demonstrated active engagement and expertise in exploring the relationship between digital transformation efforts and employee performance. As indicated by scholars such as Antony, Becker, Broding, and Claassen, the diversity of perspectives and research interests within this field underscores the multidisciplinary nature of digital transformation research. These researchers play pivotal roles in advancing knowledge and understanding how digital transformation can optimize employee performance in today's rapidly evolving digital landscape.

The analysis of the most cited articles on "Digital Transformation for Increasing Employee Performance" reveals several key themes and areas of interest within the field (Chrusciak et al., 2023; Indrasari & Pamuji, 2023; Varshney, 2020). Notable studies by authors such as Ajigini & Chinamasa (2023), Ashfaq et al. (2020), Rachinger et al. (2019), and Bartsch et al. (2021) shed light on various aspects of digital transformation initiatives aimed at enhancing employee performance. These studies explore user satisfaction with AI-powered service agents, the impact of digitalization on business model innovation, and the role of leadership in crisis-induced digital transformation, particularly during the COVID-19 pandemic. Additionally, research by Bentley et al. (2016) and Singh et al. (2019) delves into socio-technical aspects of digital transformation, emphasizing the importance of organizational support for teleworker well-being and the evolving nature of sales professions in the digital age (Elizah et al., 2024; Li & Yang, 2024; Makovoz & Lysenko, 2024). These most cited articles offer valuable insights into the complexities and opportunities associated with digital transformation initiatives to enhance employee performance and organizational outcomes.

The keyword analysis provides further insights into the themes and concepts prevalent in the discourse on digital transformation for increasing employee performance. Keywords such as "digital transformation," "digitalization," and "Industry 4.0" strongly focus on leveraging technological advancements to optimize organizational processes and workflows (Aly, 2022; Kane et al., 2015; Nadeem et al., 2024; Nadkarni & Prügl, 2021). Additionally, terms such as "COVID-19" and "remote work" highlight the growing relevance of remote work arrangements and the impact of the COVID-19 pandemic on workplace dynamics. Keywords related to "digital leadership," "digital skills," and "employee engagement" underscore the importance of leadership practices and skill development initiatives in driving successful digital transformation efforts. Moreover, "sustainability" and "innovation" reflect broader organizational objectives of fostering sustainability and innovation through digital transformation initiatives. Overall, the keyword analysis provides a comprehensive overview of key themes and trends shaping the discourse on digital transformation and its implications for enhancing employee performance within contemporary organizational contexts.

The analysis of international collaboration networks in digital transformation research, particularly concerning employee performance, reveals significant patterns and contributions from various countries. The United States and the United Kingdom are identified as leading contributors, with strong collaboration networks within their research institutions, which aligns with findings in public administration research where these countries also hold dominant positions in international cooperation networks (Wei et al., 2024). Germany, China, and Australia have also made notable contributions, reflecting the global nature of research endeavors in this field (Rubini et al., 2024). Emerging research hubs such as India and Malaysia are increasingly involved in international collaborations, indicating a growing global interest in digital transformation and its implications for employee performance (Wanzenböck et al., 2024). The role of digital transformation in enhancing employee performance is underscored by factors such as organizational culture, leadership, and the efficient use of resources, which are

crucial for successful implementation (Widodo et al., 2024; Deny, 2023). The COVID-19 pandemic has further accelerated digital transformations, highlighting challenges such as remote socialization for new employees, which can be mitigated through web-based applications that facilitate network expansion (Yu et al., 2023). Additionally, the importance of diverse and strategic collaborations is emphasized in various contexts, including translational research and university-enterprise partnerships, which drive innovation and regional development (Díaz-Faes et al., 2023). These insights collectively underscore the importance of international collaboration in advancing knowledge and innovation in digital transformation research, ultimately contributing to improved employee performance across different regions and sectors.

In conducting bibliometric analysis co-citation analysis through co-authorship is a valuable method for exploring collaborative networks among authors in the field. Authors such as Bakker A.B. Dhir A. and Tarafdar M. stand out for their substantial citation counts and high total link strengths, indicating significant contributions to the literature in this domain. As reflected in co-authorship relationships, collaborative ties between authors are essential for advancing knowledge and fostering interdisciplinary research in areas such as digital transformation and employee performance. By analyzing co-citation through co-authorship, researchers can identify key scholars and research groups that drive innovation and shape digital transformation's theoretical and practical landscape in organizational settings. This analysis can inform future research directions and facilitate collaborations that contribute to further understanding and addressing challenges in this dynamic field.

The results derived from this investigation highlight the essential significance of digital transformation in augmenting employee performance, corroborating previous studies that demonstrate how digital technologies facilitate efficiency, innovation, and adaptability within contemporary organizations (Elizah et al., 2024; Makovoz & Lysenko, 2024; Bartsch et al., 2021; Ashfaq et al., 2020). In particular, the focus on digital leadership and proficient change management during times of swift digitalization resonates with research examining the function of leadership in transformations precipitated by crises, notably throughout the COVID-19 pandemic (Ohinok & Hunka, 2023). Additionally, the outcomes of this study contribute to the expanding dialogue regarding remote work and its repercussions on employee well-being and productivity, as analyzed in investigations pertaining to telework (Bentley et al., 2016; Salkenov et al., 2022). These findings further correspond with scholarly work that underscores the socio-technical dynamics inherent in digitalization, such as the integration of artificial intelligence tools, and the evolving characteristics of occupational roles (Singh et al., 2019). Moreover, the recognition of emerging trends in employee engagement and the development of digital competencies offers a sophisticated comprehension of how organizations may cultivate resilience and adaptability in an environment characterized by digital transformation (Ashfaq et al., 2020). Subsequent research endeavors could investigate the longitudinal effects of digital transformation initiatives on employee outcomes, particularly within varied cultural and organizational frameworks (Cosa & Torelli, 2024; Sri et al., 2024; Suwaji et al., 2024).

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Ethical Considerations

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Conflict of interest

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